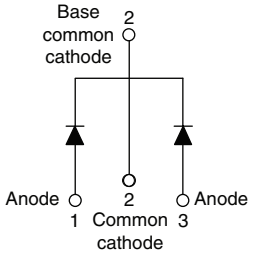
Schottky Rectifier, 2 x 20 A

TO-220AB



FEATURES

- 150 °C T_J operation
- Center tap TO-220, D^2PAK and TO-262 packages
- Low forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Designed and qualified for industrial level

DESCRIPTION

This center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

PRODUCT SUMMARY	
$I_{F(AV)}$	2 x 20 A
V_R	45 V

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform (per device)	40	A
V_{RRM}		45	V
I_{FRM}	T_C = 118 °C (per leg)	40	A
I_{FSM}	t_p = 5 µs sine	900	
V_F	20 Apk, T_J = 125 °C	0.58	V
T_J	Range	- 65 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	MBR4045CT	UNITS
Maximum DC reverse voltage	V_R	45	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS						
PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current	per leg	$I_{F(AV)}$	T_C = 118 °C, rated V_R		20	A
	per device				40	
Peak repetitive forward current per leg		I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 118 °C		40	
Maximum peak one cycle non-repetitive surge current per leg		I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	900	
			10 ms sine or 6 ms rect. pulse		210	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 3 A, L = 4.40 mH		20	mJ
Repetitive avalanche current per leg		I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		3	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**VALUES**	**UNITS**
Maximum forward voltage drop	V_{FM} (1)	20 A	T_J = 25 °C	0.60	V
		40 A		0.78	
		20 A	T_J = 125 °C	0.58	
		40 A		0.75	
Maximum instantaneus reverse current	I_{RM} (1)	T_J = 25 °C	Rated DC voltage	1	mA
		T_J = 100 °C		50	
		T_J = 125 °C		95	
Maximum junction capacitance	C_T	V_R = 5 V_{DC}, (test signal range 100 kHz to 1 MHz) 25 °C		900	pF
Typical series inductance	L_S	Measured from top of terminal to mounting plane		8.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs

Note
(1) Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum junction temperature range	T_J		- 65 to 150	°C
Maximum storage temperature range	T_{Stg}		- 65 to 175	
Maximum thermal resistance, junction to case per leg	R_{thJC}	DC operation	1.5	°C/W
Typical thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth and greased (Only for TO-220)	0.50	
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation (For D^2PAK and TO-262)	50	
Approximate weight			2	g
			0.07	oz.
Mounting torque — minimum		Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
Mounting torque — maximum			12 (10)	
Marking device		Case style TO-220AB	MBR4045CT	

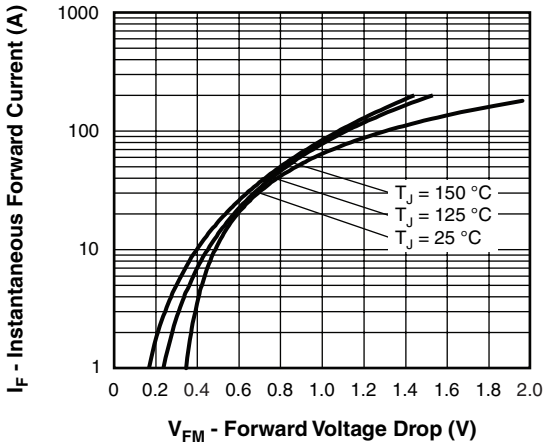


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

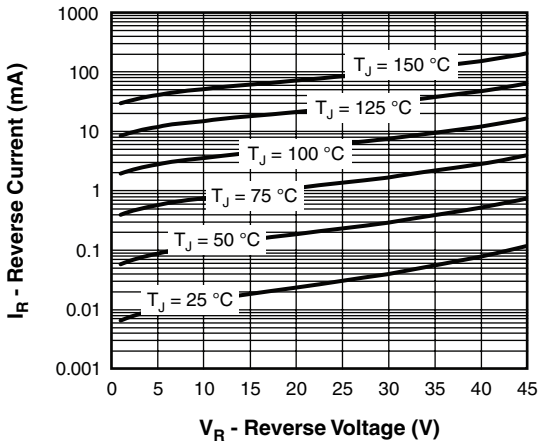


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

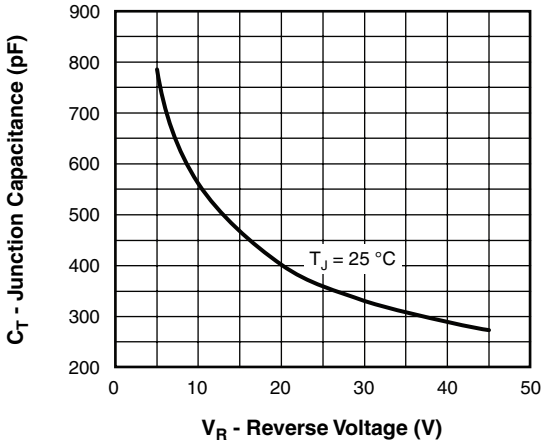


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

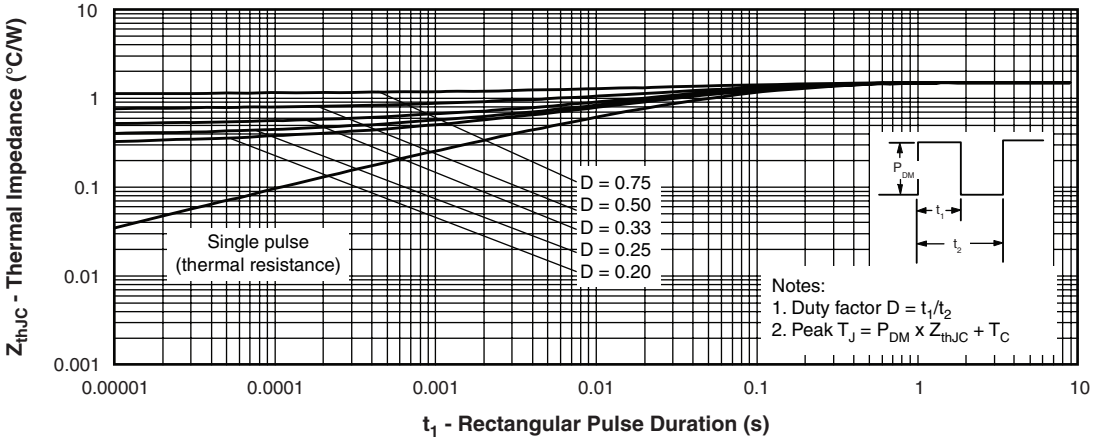


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

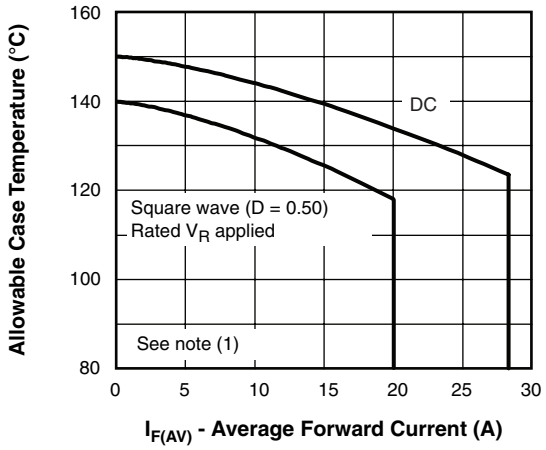


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

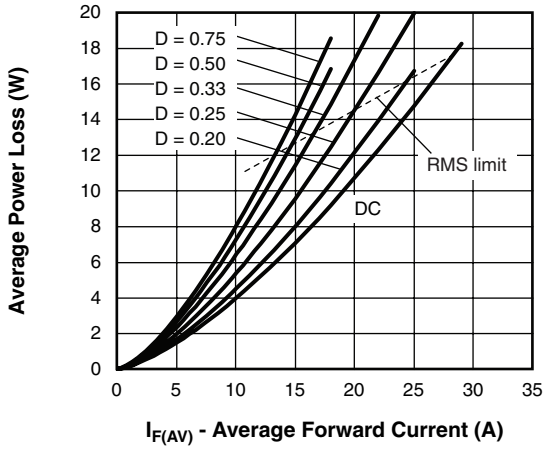


Fig. 6 - Forward Power Loss Characteristics

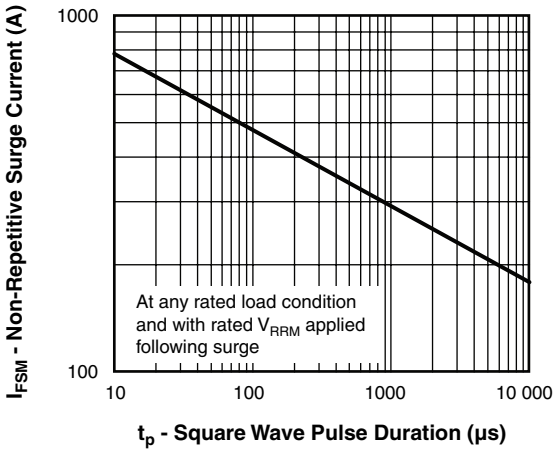


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R$ (1 - D); I_R at V_{R1} = Rated V_R

ORDERING INFORMATION TABLE

Device code

MBR	40	45	CT	-
1	2	3	4	5

1 - Schottky MBR series
2 - Current rating (40 = 40 A)
3 - Voltage rating (45 = 45 V)
4 - CT = Essential part number
5 - • None = Standard production
• PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95222
Part marking information	http://www.vishay.com/doc?95225
SPICE model	http://www.vishay.com/doc?95296

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